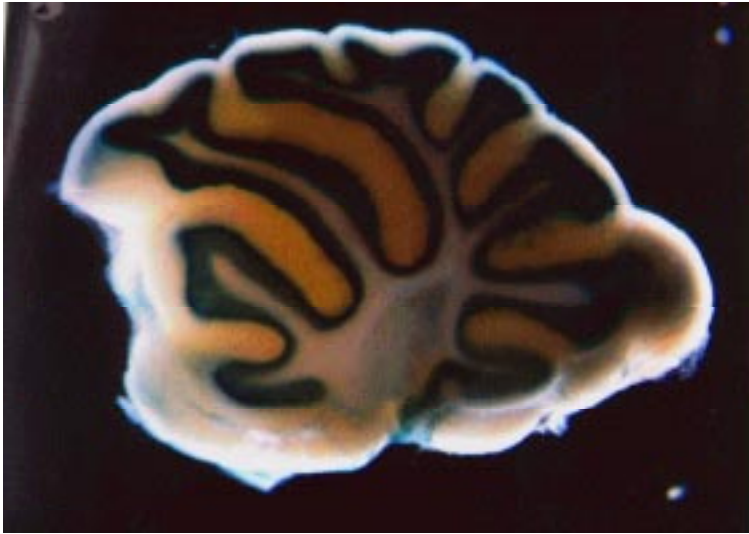


New Strategies & Architectures for Brain Imaging

Stanford University/ J. S. Harris



Objective

Develop new imaging techniques with the ability to resolve brain activity patterns at the individual neuron or individual synapse level while retaining the depth penetration powers and non-invasive characteristics of magnetic resonance imaging (MRI).

Approach

- Develop instrumentation optimized for both static & dynamic imaging of neural & tissues in embryos
- Develop molecules for labeling cells in a living embryo that are detectable by NMR imaging
- Perform multimodal imaging to establish the biological correlations between modes' features
- Compare genetic networks & advanced adaptive computing systems to determine their application to hybrid biological/electrical systems & computer architecture

Schedule

Year One:

- Adapt GFP and laser spectroscopy systems for high resolution imaging.
- Develop micromachining and design instrumentation for high resolution NMR to image injected fly and fish embryos.

Year Two:

- Observe and analyze embryos expressing engineered transgenes coding for GFP.

Year Three:

- Construct fate maps of developing embryos using whole embryo NMR labels.